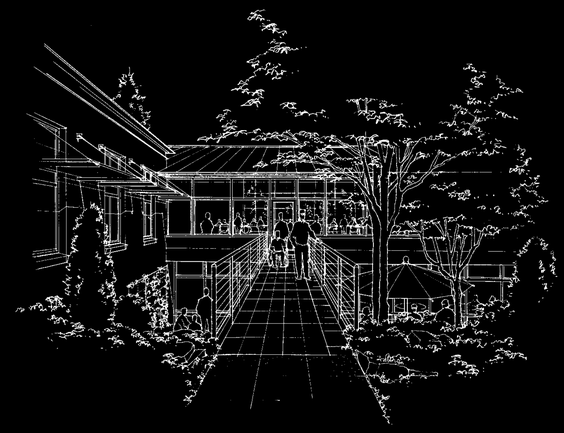
nbbj

WASHINGTON STATE VETERANS HOME

SKILLED NURSING FACILITY

A NEW VA SKILLED NURSING FACILITY is designed to provide the highest possible quality of care for residents who will "age in place." They will grow older in comfort at this facility with a sense of dignity and of being at home in a beautiful setting. Their individual rooms and commons areas have large, high windows that provide plenty of daylight and fresh air, along with views of the natural setting - connecting them to the world outdoors. A central spine creates a corridor of interaction, tying common areas together with the structure's separate wings varying in size from twenty to forty rooms. Public spaces also welcome visitors and connect the facility to the community. Finally, as an energy efficient project, the facility is not a drain on local energy resources.

OWNER	State of Washington
CLIENT	Washington Department of Veteran's Affair
ARCHITECT	NBBJ
CONTRACTOR	M.A. Mortenson
GREEN CONSULTANTS	NBBJ
CONSULTANTS	Geo Engineers Historical Research Associates Keen Engineering, Inc. KPFF Consulting Engineers Michael R. Yantis Associates Restaurant Design and Sales SiteWorkshop Sparling



FROM THE START, designers had to address the Washington State W.A.C. mandate for maintaining a standard temperature of 75° F in all resident areas of a skilled nursing facility. Numerous meetings, dialogues with and presentations to the Department of Health were required to establish an exception to the W.A.C.

Cost transfer was a key to implementing the project's energy strategy. Based on the need for a thermal mass, a detailed analysis of a steel structure and a precast concrete structure showed that a $400,000 premium was required to obtain the necessary thermal mass. In turn, the cost transfer to offset this premium was achieved by comparing the cost of a fully air conditioned building to a naturally cooled facility with minimal ducted ventilation.

Finally, the comfort conditions for natural ventilation and a number of significant design issues had to be resolved. A detailed thermal analysis of resident rooms, the local micro-climate, the thermal mass, the Fanger equation, the window and exterior shade details, and all the building envelope properties was conducted. In the end, the Department of Health's requirement for no more than 49 hours above 75° F was met, far exceeding the LEED comfort criteria.

Staying focused on sustainability and quality of life issues was vital in creating this design - utilizing the site's natural waterfront setting as a valuable source of energy. All the criteria were met, and the project will set a new precedent for enhancing the later years of selected Washington state veterans.

sustainable design

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Site

Great consideration was given to the site's natural waterfront location as a key factor in creating a sustainable project in terms of its environmental, economic, and social requirements. Quality of life for the residents was a prime motivation - making sure that the facility enhanced their care. An important part of this goal was to ensure that the structure respects and incorporates the natural beauty of the setting. The result is a unique articulated building that hugs the site contours, minimized excavation, and implements large windows to remain open to sea breezes and views. In turn, light pollution at night is controlled with special lighting fixtures that point downwards rather than up and out in order to avoid disrupting the indigenous wildlife.

Additionally, the landscape development and design is carefully gauged to ensure that environmentally responsible measures are integrated with drainage, storm water management, water conservation, tree protection and use of environmentally sound, recycled material as much as appropriate. Sustainable design principles are guiding the use of water and the selection of indigenous plants and other landscape materials to ensure an environmentally responsible design.

Waste

In order to reduce waste, the structure was designed to fit the site and minimize the amount of excavation required, while excavated soil was re-used as infill. The design team also explored the re-use of components from the existing building, and specified materials that come in re-usable packaging.

Integration

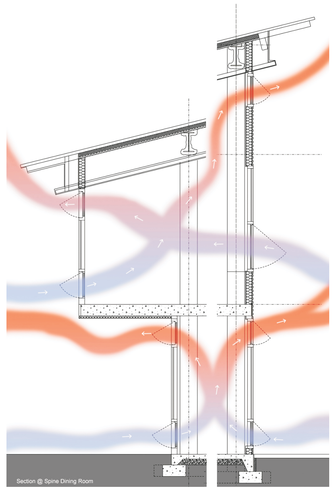
In the early pre-design of this project, all members of the design team participated in a design charrette that focused on its sustainable aspects, its design, and on the integration of program requirements and systems. Architects, engineers, landscape designers, interior designers, lighting designers, and the contractor, together with the client, all gathered around one table.

The client was skeptical at first, but interested in finding ways to create the best possible facility for the residents, and accepted the goal of a fully naturally ventilated building. To achieve this, many architectural elements were integrated with engineering principles. For example, the east-west orientation of the main building spine, along with the fins and overhangs, was determined to control south solar loads; high and low operable windows in the dining spaces were to provide two sources of daylight and cross ventilation to achieve appropriate comfort levels; and the nursing wings have exterior shutters to control solar gain on their varying north and south orientations. Additionally, the landscape architect devised a scheme using indigenous plants, while the lighting designer established a lighting system that controls light pollution and avoids disrupting the area's wildlife.

The architects began by using the LEED criteria and then developed their own assessment criteria to meet the standards required by the state, but by using sustainable methods. Remaining focused on the goal, money was not spent on anything that was not in keeping with the sustainable character of the project, and a strict budget was maintained.

Energy

Based on the site's mild climate with consistent breezes blowing from Sinclair Inlet, this project has achieved an innovative exception to mandated WAC design comfort standards. Current Department of Health code mandates the use of a mechanical cooling system regardless of microclimate and does not recognize engineered natural cooling as an option. By working with the temperature range requirements instead of the letter of the code, the design team was able to negotiate a performance-based requirement and fulfill it using engineered natural ventilation. The engineering standard that the building will meet is the W.A.C. which states, "all resident spaces must meet 75° F within two and a half percent of the time." Based on the national ASHRAE standard, the current state code mandates the use of a mechanical cooling system regardless of microclimate, and does not recognize engineered natural cooling as an option. Setting a precedent for a state project, natural cooling was approved for this project.



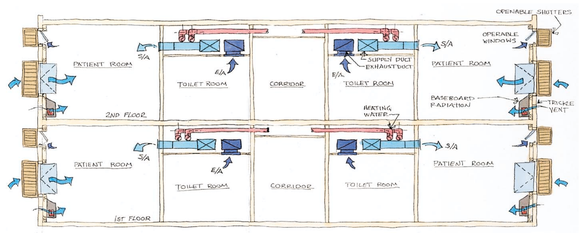
Large, independently operated windows facilitate the naturally cooled system, not only providing a greater number of air changes than are possible with a mechanically cooled system, but also more accessibility to daylight. In turn, the main building spine is oriented from east to west, with overhangs and fins, to control solar heat gain from the south. The nursing wings further have exterior shutters to control solar gain on their varying north and south sides.

Indoor Air Quality

With proximity to Sinclair Inlet and its sea breezes, the Washington Department of Veterans Administration recognized an opportunity to manage a unique natural resource to benefit the facility's residents. In resident rooms, as well as in common areas, the number of fresh air exchanges is actually greater than would be possible with a mechanically cooled system.

The Skilled Nursing Facility has mechanical systems that aid the natural ventilation process. These systems have a very high filtration capability and provide the facility with an excellent indoor air quality. The air handlers are designed with pre-filters and final-filters to meet the indoor air quality standards required by the state guidelines. However, the mechanical air handling systems provide only the minimum outdoor air ventilation requirements needed to compensate for natural ventilation when the windows are closed. The mechanical ventilation systems are tempered to provide comfort to the residents and filtered to meet indoor air quality standards.

Within resident rooms, high ceilings and concrete mass, plus high and low operable windows, combine to create natural cooling air currents that are effective even on warm, windless days. In the dining and multi-purpose rooms, the building is designed to promote cross-ventilation. The concrete structure provides a cooling mass for the air to flow over. High and low windows facilitate natural convection currents of warm air rising to flow out of the high windows with cool air sinking and settling at occupied height.



Materials Recycled

The design team worked towards a sustainable project from a micro to a macro scale. All the consultants were integrated early on with sustainability as a goal. The landscape architects, for example, specified the use of indigenous plants that will require relatively little care and will mature naturally. As much as possible, recycled materials were specified, from interior finishes to gypsum board to certified wood. And, as mentioned above, excavated soil was re-used as in-fill.